State Of California

The Resources Agency of California

Memorandum

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To: Commissioner Arthur Rosenfeld, Presiding Member
Commissioner John Geesman, Associate Member

From: **California Energy Commission**
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Subject: **STAFF'S ANALYSIS OF RECONDUCTORING PROJECTS RELATED TO THE SAN JOAQUIN VALLEY ENERGY CENTER REVIEW PROCESS (01-AFC-22)**

Attached is staff's updated analysis of the potential environmental and public health impacts related the reconductoring of several transmission lines that would likely occur as an indirect effect of the construction and operation of the San Joaquin Valley Energy Center (SJVEC). Staff originally issued its analysis of the reconductoring projects as an Appendix to the Transmission System Engineering section of the Staff Assessment, which was attached to the Addendum to the Staff Assessment released December 24, 2002. The attached document replaces the reconductoring analysis in the December 24, 2002, addendum, and changes are shown in the underline/strikeout format, with new text underlined and deleted text struck through.

The original reconductoring analysis was based on initial comments by Pacific Gas & Electric (PG&E), which owns the transmission lines in the area of the SJVEC site, as well as from the California Independent System Operator (CA ISO). Staff then determined that reconductoring of three transmission lines would likely be required before the proposed project could interconnect to the PG&E's transmission network. The three lines are the SJVEC–Panoche line, the Helm–Panoche line, and the Helm–McMullin–Kearney line, all of which are rated at 230 kV. In April 2003 PG&E completed a Facility Study for SJVEC that in conjunction with a CA ISO analysis shows that several more transmission lines would require reconductoring for the interconnection and operation of the SJVEC. These new lines include:

Herndon–Kearney 230 kV line (11 miles)
Borden–Gregg 230 kV line (8 miles)
Gregg–Storey 230 kV line (10 miles)
SJVEC–McCall 230 kV (32 miles)

The attached analysis examines the potential impacts of the reconductoring of these additional transmission lines, as well as the three originally identified lines. Though the applicant continues to insist that no reconductoring is needed in order to meet its

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business goals for the SJVEC, staff has determined that the reconductoring of the seven lines is a reasonably foreseeable event that would follow the licensing of the plant. However, because the work would be done by PG&E and would be regulated by the California Public Utilities Commission, which is the agency that has approval authority for such work, staff determined that a more general level of analysis of the reconductoring is appropriate.

The purpose of the staff's reconductoring analysis is to inform the Energy Commission, interested parties and the general public of the potential indirect environmental and public health effects caused by the approval of the SJVEC project. This analysis examines the nature and scope of the probable impacts of reconductoring, should it occur, and describes measures for mitigating these impacts to a less-than-significant level. As in its December 2002 analysis, staff has determined that there is very little potential that the reconductoring projects would create significant, unmitigated impacts to the environment or public health.

Staff requests that the Committee reopen the evidentiary record to receive this updated Appendix to the Transmission System Engineering section of the Staff Assessment, and to provide an opportunity to all parties to the case to cross-examine staff, if they so desire. Staff suggests that the Committee schedule any cross-examination related to the reconductoring analysis as part of its conference on the Presiding Member's Proposed Decision (PMPD) for the case, and to note this opportunity for cross-examination in the official notice for the PMPD conference.

cc: Docket (01-AFC-22)
Proof of Service List

Attachment

APPENDIX TO TRANSMISSION SYSTEM ENGINEERING RECONDUCTORING PROJECT IMPACT ANALYSIS

Testimony of Matt Trask

1 INTRODUCTION AND PURPOSE

Energy Commission Staff has prepared this appendix to the Transmission System Engineering section of the Staff Assessment for the San Joaquin Valley Energy Center (SJVEC) project in order to examine the potential indirect impacts of the project associated with future reconductoring of transmission lines. Reconductoring involves replacing the cables on one or more transmission line segments with new cables that, because of improvements in the metallurgy of the conductors, allow a large increase in the current-carrying capacity of the segment, without increasing the weight or size of the cable. Reconductoring also may involve modifying or even replacing one or more of the transmission line towers because the new conductors have different sag characteristics, which may require raising the height of certain towers.

Though the Applicant contends that reconductoring will not be necessary to meet its business goals for developing the SJVEC, Staff's analysis of the potential effects on the transmission system caused by operation of the proposed facility shows that reconductoring of the Panoche-Helm, Panoche-SJVEC, SJVEC-McMullin-Kearney, Herndon-Kearney, Borden-Gregg, Gregg-Storey , SJVEC-McCall and the SJVEC-Helm[1] 230 kV transmission lines are reasonably foreseeable events. Because of this, and the requirement under the California Environmental Quality Act (CEQA) to examine foreseeable subsequent projects that result from the project, Staff has analyzed the potential impacts of reconductoring as it may pertain to the SJVEC. Reconductoring will be a separate project or projects, with a different applicant before a different agency, and will be subject to that agency's CEQA analysis. A more general level of analysis is thus appropriate for this Staff Assessment.

The actual need for reconductoring will be finally determined after PG&E has completed the Final Design Study or Cost Study for the Generator Facility Interconnection Agreement for the SJVEC project, and reaches agreement with SJVEC owner concerning funding of the needed reconductoring. At that time, presuming reconductoring is actually needed, PG&E would apply to the California Public Utilities Commission (CPUC) for authority to implement the reconductoring project, and to recover the cost of the reconductoring from Calpine and/or PG&E ratepayers[2]. Depending upon the complexity of the reconductoring work, PG&E may prepare a Proponent's Environmental Assessment (PEA), in which PG&E would discuss the

[1] The SJVEC-Helm line would be constructed as part of the SJVEC project; however, PG&E's most recent facility study indicates the line should be redesigned from its original specifications, which is why it is included in this analysis as a line to be recondutored. As well, this line segment would become part of what is now the Panoche-Kearney line, and is included in this analysis because it is part of the re-engineering of the local transmission network that may occur as a result of operation of the SJVEC..

[2] The process for determining the cost and funding obligations for transmission system upgrades in California is the subject of a current Federal Energy Regulatory Commission proceeding and has not been finally determined.

design and construction procedures for the reconductoring project, examine potential impacts to the environmental and public health that would be caused by the reconductoring, and propose mitigation that would either eliminate, avoid, reduce to a less-than-significant level, or compensate for any identified impact.

The CPUC would use the PEA to focus quickly on any impacts of the project that may be of concern. If there is no possibility that the project may have a significant adverse environmental impact, the CPUC may find the project exempt from CEQA. Otherwise, the CPUC may use the PEA in preparing an Initial Study, which it would use to determine whether to prepare a Negative Declaration or an Environmental Impact Report. However, the CPUC also has authority to waive the CEQA review even without the submittal of a PEA from PG&E, if the work proposed is non-controversial and presents little possibility of significant impact. Because the reconductoring process is so well understood, and because the reconductoring process allows sufficient flexibility to avoid any environmental impacts in the vast majority of cases, the CPUC generally exempts simple reconductoring projects from CEQA review.

The purpose of the CEC's reconductoring analysis is to inform the Energy Commission, interested parties and the general public of the potential indirect environmental and public health effects caused by the approval of the SJVEC project. This analysis examines the nature and scope of the probable impacts of reconductoring, should it occur, and measures for mitigating these impacts to a less-than-significant level.

The analysis is based upon information supplied by the Applicant, as well as on information gathered from PG&E, the Independent System Operator, and other sources. This analysis describes the process of reconductoring and the types of environmental impacts that might occur as a result of reconductoring. It also discusses specific aspects of the reconductoring project that Staff has determined would likely occur as a result of approval of the project, such as its location and some likely places for pull and tensioning sites, and staging yards.

Finally, this analysis draws conclusions as to the likelihood that the reconductoring could be accomplished with no significant environmental impacts, and identifies mitigation measures that could be enacted to ensure the reconductoring project would not cause significant impacts. Because the potential for impacts in several technical areas are essentially non-existent, several of the areas normally studied in a Staff Assessment have been eliminated from this analysis. These are: Air Quality, Facility Design, Hazardous Materials Management, Power Plant Efficiency, Power Plant Reliability, Worker Safety, Socioeconomic Resources, and Waste Management. Impacts to those areas, if any, would be similar but likely much less in severity to those related to construction of the project and its associated linear projects; and the construction-related analysis and proposed mitigation measures in those sections of the Staff Assessment for the SJVEC provides a general understanding of the potential impacts in those areas that could possibly, but not likely, be caused by a reconductoring project.

2 CONCEPTUAL DESIGN OF RECONDUCTORING

This Chapter identifies the specific transmission line segments that Staff believes will be reconductored as a result of licensing the SJVEC, and provides an overview review of the reconductoring process on a general level. It describes the basic work involved in reconductoring a transmission line segment, as well as specific designs (when known) for the reconductoring project that is a reasonably foreseeable result of the approval of the project.

2.1 DESCRIPTION OF THE PROPOSED PROJECT(S)

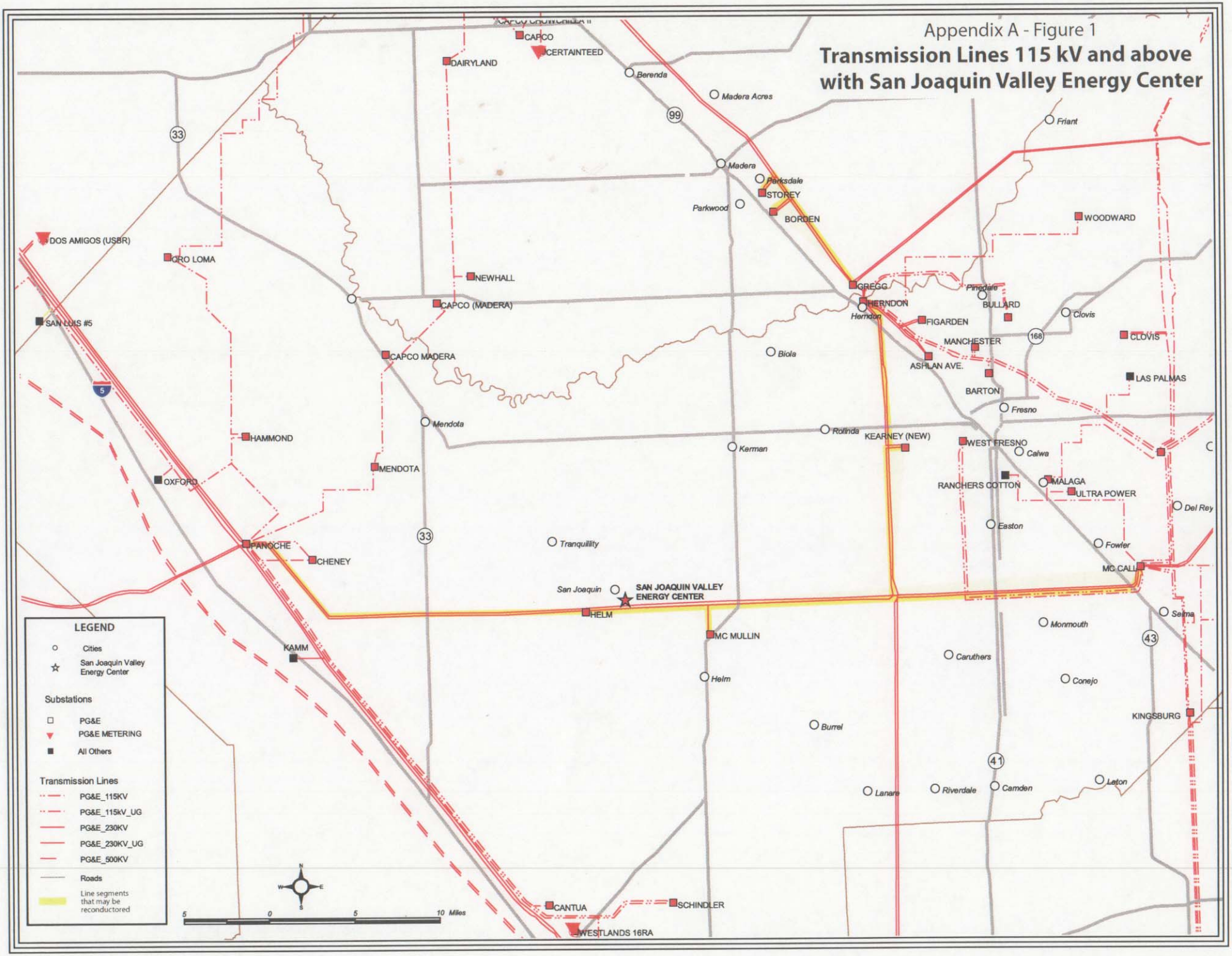
As proposed, the SJVEC would connect to the PG&E electrical grid by looping the Panoche–McCall 230 kV line and the Panoche–Kearney 230 kV line into the SJVEC switchyard. This would require two new double circuit 230 kV lines approximately 1,500 feet in length. These lines would use the same right-of-way and would change the existing PG&E network by looping into two lines. The existing Panoche–McCall (Helm) 230 kV line would become the Panoche–SJVEC 230 kV line and the SJVEC–McCall 230 kV line. The existing Panoche–Kearney 230 kV line would become the Panoche–Helm 230 kV, Helm–SJVEC 230 kV and the SJVEC–Kearney 230 kV lines.

Energy Commission Staff have determined that construction and operation of the proposed SJVEC would likely trigger the need to reconductor eight lines in six corridors. The eight lines are the SJVEC to Panoche line, the Helm to Panoche line, the SJVEC to Kearney line, the SJVEC to McCall line, the Kearney to Herndon line, the Borden-Gregg line, SJVEC-Helm and the Gregg-Storey line, all of which are rated at 230 kV. These line corridors are highlighted in yellow in Appendix A Figure 1, "Transmission lines 115 kV and above with San Joaquin Valley Energy Center." The Helm-Panoche and SJVEC-Panoche transmission line segments run in a common corridor that extends westward and northwestward from the Helm Substation to the Panoche Substation. As the name implies, the SJVEC to Kearney line runs eastward from the SJVEC Project switchyard and terminates at the Kearney substation.

The Helm to Panoche transmission line carries a single 230 kV electrical circuit between the Helm Substation, located near the City of San Joaquin, Fresno County and the Panoche Substation, located in Panoche, Fresno County, California, a distance of 19.6 miles. The line begins at the Helm Substation and runs westward across cultivated fields parallel to Manning Avenue, before crossing the San Luis Canal of the California Aqueduct. Approximately 2.5 miles west of the California Aqueduct, the line turns northwestward and continues across orchard lands and agricultural fields for approximately 4.6 miles before reaching the Panoche substation. The SJVEC-Panoche and the Helm- Panoche 230 kV lines are two circuits on a single set of poles with the Panoche-SJVEC line going north for 1,500 feet from the Helm substation to the project switchyard. The total length of the Panoche-Helm 230 kV and the Panoche-SJVEC lines is approximately 25 miles

Appendix A - Figure 1

Transmission Lines 115 kV and above with San Joaquin Valley Energy Center



The SJVEC-Kearney transmission line carries a single 230 kV circuit. It runs directly east for 15.8 miles, crossing cultivated agricultural fields as well as the James Bypass just past Raisin City, before turning north for 7.0 miles and the east for 0.8 miles. The final 2 miles crosses the wastewater treatment plant ponds for the Fresno Wastewater Plant. The Kearney-Herndon line carries a single 230 kV circuit that travels 0.8 miles westward in the same corridor as the SJVEC-Kearney line before turning northward for about 7 miles to just north of Highway 99, where the line bends northwestward for about 2 miles to the Herndon substation, which is located near the southern bank of the San Joaquin River where the river crosses under Highway 99.

The Borden-Gregg transmission line carries a single 230 kV circuit. It runs northwest for approximately 8 miles from the Gregg substation, located near Highway 99 and the San Joaquin River, along a route paralleling the route of Highway 99 about 2 miles to the east, then turns and heads due west for approximately 2 miles to the Borden substation located near the community of Borden. The Gregg-Storey line carries a single 230 kV circuit that shares the same corridor as the Borden-Gregg line for about 8 miles, then continues northwest along the same route paralleling Highway 99, traveling approximately 2 miles until it turns due west for about 2 miles to the Storey substation located southeast of the City of Madera.

Temporary staging areas for equipment and materials storage are required for any reconductoring project. The Helm-Panoche, SJVEC-Kearney, SJVEC-McCall, Kearney-Herndon, Borden-Gregg and Gregg-Storey lines will each require a 1 acre staging yard at each of their terminal ends, plus an additional staging area located at the SJVEC site near the Helm substation. Marshalling yards would likely be located on agricultural fields next to the Panoche, Kearney, McCall, Herndon, Borden, Gregg and Storey Substations, and would be rented or leased for the construction period. Each reconductoring project would take approximately 4 to 5 months, overall. The reconductoring work would probably occur during times of relatively low electrical demand to protect system reliability while the lines are out of commission. This may mean that crews would work through two seasons to accomplish all the reconductoring needed for the SJVEC project.

The project area consists of primarily of agricultural land uses. There are no cities along the transmission lines identified above, though the number of proximate farm houses, residences and landscape habitat types increases near the City of Fresno. The SJVEC-Kearney line crosses through an extensive area of industrial development on the south side of Kearney substation, as it crosses the Fresno Wastewater Treatment Plant ponds. The SJVEC-Kearney, SJVEC-McCall, SJVEC-Panoche, Helm-Panoche and Kearney-Herndon transmission line routes are accessible via agricultural roads that are generally perpendicular to main paved roads such as Manning Avenue and Hayes Avenue. The Borden-Gregg and Gregg-Storey line routes are accessible either by various agricultural roads in the area or from the Atchison, Topeka and Santa Fe Railroad right-of-way, which parallels much of the Borden-Gregg and Borden-Storey transmission line corridors about a mile to the east.

Though not anticipated at this time, the reconductoring projects may also require modifying the transmission towers, such as raising the height of the towers to

accommodate the different sag characteristics of the new conductors, which may require some additional work on the concrete foundation for one or more towers. The need for foundation work would be determined during inspections conducted by PG&E as part of forming the engineering plans for the reconductoring project. Foundation work could range from patching minor cracks in the concrete, to complete replacement of the foundation, which would require excavation work around the base of the tower. For the vast majority of reconductoring projects, however, excavation work near the towers is not needed.

2.2 CONSTRUCTION METHODS

In general, reconductoring is accomplished by disconnecting the old line and using it like a rope to pull the new line through the temporary pulleys, called "travelers" or "sheave blocks," that are mounted on each tower, until it reaches the other end. Workers access each tower by truck in order to place the temporary pulleys on each tower and route the cables through them. If the old line is not in good enough condition to be used to pull in the new line, it would be used to pull a carrier cable, or "sock line," through the pulleys to the end of the segment to be replaced; the sock line would then be used to pull the new conductors. Depending on the nature of the project, a helicopter can be used to string the sock line and transport workers and materials to the structures. Helicopter reconductoring methods have proven highly effective where access is difficult or in areas where impacts from access create concern. Helicopter work is not anticipated for the reconductoring projects identified above, as the topography is generally flat and the land previously disturbed.

The work involves setting up two work crews on either end of the segment that is being replaced. Each crew generally consists of two large tractor/trailer units, which either feed out the new line or wind in the old line on spools mounted on the trailers, plus various machinery such as cranes and two or three utility trucks carrying tools, other materials, and workers, for a total of 8 to 10 trucks and about 20 workers involved in the work at any one time. One crew sets up at a "pull site" near a tower at one end of the pull, and the other at a "tensioning site" near a tower at the other end of the pull. The tensioning crew would employ a special tensioner truck, which is essentially a large drum winch that is used to put back tension on the line being pulled. Each pull generally is limited to about 2-3 miles, and the crews generally pull three cables (one three-phased circuit) at once. Each pull station requires a work area of about 100' by 200' and each tensioning station requires a work area of about 100' by 300'.

The tensioning site crew either climbs or uses a truck-mounted aerial bucket (also called a "cherry-picker") to access the tower, disconnect the old conductors, and attach them through the tensioner truck to the new conductor on spools on the large trucks. The pull site crew also climbs the tower and disconnects the lines, and attaches them to the spools in the large trucks below the tower. During this time, other crews set up temporary structures across roads and other potentially inhabited areas to protect those areas in the unlikely event that a conductor breaks and the line falls to the ground.

Once all protective structures are in place and the pull and tensioning sites are ready, the pull crew then begins to carefully wind in the old lines onto the spools on the trucks, thus pulling the new lines through the pulleys on the towers along the segment being

replaced, while the tensioning crew keeps the lines taught, preventing them from sagging to the ground or other objects in the right-of-way. Once the new lines are in place, the crews once again access each tower, disconnect the new lines from the pulleys and install them in permanent insulator clamps.

The crews usually pull the new conductors through two or more miles of transmission towers at a time. Because the potential for environmental impact is generally nonexistent between the pull and tensioning sites, this analysis focuses particularly on examining potential effects at the likely pulling and tensioning sites, as well as at other locations that could be disturbed by truck movement, such as near towers that may require modification as part of the reconductoring. Activities between the pull and tensioning sites are generally restricted to 1) accessing the towers (either by climbing or using a truck-mounted aerial bucket) to place the pulleys and to remove the conductor from the pulleys and refasten it once stringing is completed; and 2) work on the tower structure itself to repair or replace spars that are damaged, or to replace insulators.

Though determining now precisely where the pull and tensioning sites would be located is not possible, they are generally sited at "angle" towers, which are located where the line makes a change in direction of more than 10 degrees. Pulling the old lines and reeling out the new conductors is easier at these locations because the pulling and tensioning equipment can be arranged in line with the transmission line. Conversely, the crews try to avoid pulling the line through one or more angle towers because the conductors cannot be efficiently pulled through such an angle. Pulling and tensioning can also take place at "deadend" sites, which are towers where the transmission line is physically connected to the tower, rather than merely passing through the insulator clamps, and in general is where one spool of cable is spliced to the next spool. Deadend sites are generally located at angle towers, but also can be located at towers that are in-line with the route, rather than at an angle to the route. Deadend towers have significant structural strength and resist the forces of pulling. The locations of angle and deadend towers on the lines described above are not known at this time. The exact locations the crews will work from would not be known until PG&E draws up final engineering plans for the reconductoring projects.

The work crews likely will have a great deal of flexibility in choosing the locations of the pull and tension sites, as it may be possible to pull through the angles on some of these towers (less than 30 degrees). Because of the flexibility in locating work sites, crews can generally select sites that either avoid creating impacts altogether, or create less-than-significant impacts with certain mitigation measures enacted. All likely pull or tensioning sites are accessible from existing roads, and essentially every tower in the corridors described above is located on highly disturbed agricultural land.

The work crews would also set up equipment at some towers that may be modified as part of the reconductoring project. Because the new conductors may sag closer to the ground during hot days when the lines are fully loaded, some towers may need to be raised, perhaps as much as 16.5 feet in height. This can be done through one of three methods: a "top cage" extension, where additional structure is added to the top of the tower to raise its top to the required level; a "waist cage" extension, where the top half of the tower is separated from the bottom half at about its mid-level, additional structure is inserted, and the top is replaced onto the new part of the structure; and a "base cage"

extension, where the tower is separated from its concrete base, new structure is installed on the base, and then the tower is placed back on top of the new structure.

According to PG&E, these work areas needed to modify the height of towers would be similar in size to those for the pulling and tensioning sites. The equipment needed would consist of a truck-mounted crane capable of lifting the existing tower off its base, plus three or four smaller support vehicles. Workers would attach the crane to the tower, then separate the portion that would be elevated, and pull that portion up to provide clearance for the new structure. The new structure is welded and/or bolted in place, and the existing structure is then lowered back onto the new structure and welded and/or bolted in place. In most cases, the existing conductors would not have to be removed from the tower while it is modified.

Also during the reconductoring process, the work crews may replace all the insulators on all transmission towers on the line. This work usually involves accessing the tower with a truck-mounted aerial bucket or by climbing, removing the old insulator strings, and installing new ones. The new insulators are delivered and held in place by the aerial bucket and or rigging attached to the tower, or, for towers that cannot be access by truck, by helicopter. The towers will also be inspected for corrosion prior to reconductoring and, if necessary, will be repaired. Repairs can include corrosion removal by mechanical means, regalvanizing and repainting.

Workers would pull in all three new cables of each transmission circuit at the same time, over a distance of approximately 2-3 miles at a time. Workers would occupy each pull or tension site for a total of about 3 days as that part of the line segment is replaced. The workers would then move on to the next pull and tension sites and set up to replace that section of the line.

3 ANALYSIS OF RECONDUCTORING

3.1 BIOLOGICAL RESOURCES

Introduction

This section provides the California Energy Commission Staff's analysis of potential impacts to biological resources that would be caused by the anticipated reconductoring projects associated with construction and operation of the San Joaquin Valley Energy Center (SJVEC). The Applicant analyzed some potentially significant environmental impacts associated with three of the expected reconductoring projects (Panoche-SJVEC, Panoche-Helm and SJVEC-Kearney) in Data Response Set 3, submitted on August 23, 2002 (Calpine 2002), which provides a discussion of the reconductoring process and how it could be accomplished. Staff verified the impacts analysis submitted by the applicant for the reconductoring of three line segments, and independently analyzed the potential impacts of the SJVEC-McCall, Kearney-Herndon, Borden-Gregg and Borden-Storey reconductoring projects.

Potential impacts to biological resources caused by the identified reconductoring projects could occur near the construction work sites that would be established for the

reconductoring. These sites include the pull and tensioning sites used to pull the new conductors onto the towers, the locations of any tower that may require modification as part of the reconductoring, and the potential sites for staging or marshalling yards. This analysis focuses on the potential impacts that could occur at those work sites, and discusses potential mitigation measures that would avoid, eliminate, reduce to a less-than-significant level or compensate for those impacts.

The actual reconductoring project or projects, if needed, will be subject to approval by the California Public Utilities Commission (CPUC), and will follow CPUC guidelines to incorporate Best Management Practices and other suitable mitigation measures to help minimize or eliminate impacts to sensitive biological resources. Staff's general analysis evaluates potential impacts to state and federally listed species, state and federal species of special concern, areas of critical biological concern and, where necessary, recommends suitable mitigation measures to reduce potential impacts to insignificant levels. Staff's analysis is based on the Data Response Set No. 3 (Calpine, 2002), cited above, as well as Calpine's Application for Certification (Calpine 2001a), Calpine's AFC Supplement, provided December 13, 2001 (Calpine 2002a), and additional information supplied by PG&E, the Independent System Operator and the California Public Utilities Commission.

Project **Description**

The Helm to Panoche and SJVEC to Panoche transmission lines begin near the City of San Joaquin, Fresno County, and ends at the Panoche Substation, located in Panoche, Fresno County, California. The Helm-Panoche line begins at the Helm Substation, and runs westward across intensively cultivated fields parallel to Manning Avenue, before crossing the San Luis Canal of the California Aqueduct. Approximately 2.5 miles west of the California Aqueduct, the line turns northwestward and continues across orchard lands and agricultural fields for approximately 4.6 miles before reaching the Panoche substation. The total length of the line Panoche-Helm 230 kV line is approximately 25 miles (Calpine, 2002). The SJVEC-Panoche and the Helm-Panoche 230 kV lines are two circuits on a single set of poles from the Panoche substation to the Helm substation, where the Panoche-SJVEC line turns north for 1,500 feet from the Helm substation to the project switchyard. The SJVEC-Kearney transmission line follows the same 1,500-foot corridor from the project site to the Helm Substation, then runs directly east for 15.8 miles, crossing intensively cultivated agricultural fields, as well as the James Bypass just past Raisin City, before turning north 7.0 miles and east 0.8 miles. The final 2 miles crosses the wastewater treatment plant ponds for the Fresno Wastewater Treatment Plant (Calpine, 2002). The Kearney-Herndon line extends northward from the Kearney Substation for about 9 miles to the Herndon Substation, near the point where the San Joaquin River crosses under Highway 99. The Borden-Gregg and Borden-Storey lines run on a corridor that parallels Highway 99 northwest of the City of Fresno, running a total of about 11 miles.

The proposed project would upgrade these lines by replacing the existing wire (conductor) with new wire. Though not anticipated at this time, the existing pole structures may also be replaced as part of the reconductoring process.

Impacts of Reconductoring

The Applicant provided a biological resources impact evaluation associated with reconductoring the Helm-Panoche, SJVEC-Panoche and SJVEC-Kearny 230 kV transmission lines (Calpine, 2002). The analysis provided a discussion of the location and the process for reconductoring the transmission lines. Staff verified the analysis of these three lines provided by the applicant, and independently analyzed the potential impacts of the other four lines identified above.

This analysis focuses on the potential impacts that could occur as a result of the construction and operation of the proposed reconductoring project, and discusses potential mitigation measures that would avoid, eliminate, and reduce the potential impacts to a less-than-significant level. Potential impacts to biological resources during reconductoring of the transmission lines could occur at the pull and tensioning sites (used to pull the new conductors onto the towers), the tower locations (requiring modifications and/or pole replacement), and the temporary staging or marshalling yard locations.

Construction associated with the reconductoring project would likely occur at corner towers where conductor pull and tension sites and pole replacement activities are required. The equipment needed for a typical reconductoring project (e.g., large 10-wheel trucks, other vehicles, cranes and/or a helicopter) could impact biological resources. Potential impacts that could result from these activities include disturbance of habitat caused by movement of the construction equipment, disturbance of nesting activities caused by construction noise, and potential take of listed species caused by construction activities.

The biological resources evaluation and habitat maps provided by the applicant (Calpine, 2002) or obtained by staff indicate that the predominant habitat type crossed by the transmission line corridors is intensively farmed agricultural land. Other habitats intersected by the transmission lines include riparian and riparian scrub, an annual grassland area (James Bypass), three emergent wetland areas (associated with three irrigation ditches), and 20 major canals (irrigation ditch or open water features). The Herndon and Gregg Substations are located near the San Joaquin River, though none of the lines anticipated for reconductoring actually cross the river. However, the Gregg-Storey and Borden-Gregg lines both cross over Cottonwood Creek at different points near the City of Madera.

The specific locations and size of the temporary pull and tensioning and marshalling areas has not been determined, although it is likely that these areas would be placed in existing agricultural areas. Each of transmission lines anticipated for reconductoring would require a staging area that is approximately one acre in size, and would be placed at each of their terminal ends.

The biological resources evaluation indicate that several historic occurrences of special status species have been reported both within and adjacent to the transmission line corridors, including one occurrence for lesser saltscale (*Atriplex miniscula*), two occurrences for brittlescale (*Atriplex depressa*), one occurrence for Fresno kangaroo rat

(*Dipodomys nitratoides exilis*), and three occurrences for San Joaquin kit fox (*Vulpes macrotis mutica*).

Transmission line tower modification activities (e.g., pole replacement), pull-tension site activities, and establishment of temporary staging or marshalling areas could adversely impact sensitive species and/or habitats. The primary biological resources concerns associated with reconductoring the transmission lines are potential construction and operation-related impacts to sensitive species and habitats. Table 1 below lists the sensitive species that are known to occur or have the potential to occur within or near the transmission line corridor.

BIOLOGICAL RESOURCES - Table 1
Sensitive Species Known to Occur in the Project Vicinity
(Calpine 2001a, Staff 2001-2)

Sensitive Plants	**Status***
Heartscale (*Atriplex cordulata*)	CNPS 1B
Brittlescale (*Atriplex depressa*)	CNPS 1B
Lesser saltscale (*Atriplex miniscula*)	CNPS 1B
Palmate-bracted bird's-beak (*Cordylanthus palmatus*)	FE, CE, CNPS 1B
Recurved larkspur (*Delphinium recurvatum*)	CNPS 1B
Munz's tidytips (*Layia munzii*)	CNPS 1B
San Joaquin woolythreads (*Monolopia congdonii*)	FE, CNPS 1B

Sensitive Wildlife	**Status***
Ciervo Aegilian scarab beetle (*Aegialia concinna*)	none
San Joaquin dune beetle (*Coelus gracilis*)	none
Giant garter snake (*Thamnophis gigas*)	FT, CT
Blunt-nosed leopard lizard (*Gambelia sila*)	FE, CE
California horned lizard (*Phrynosoma coronatum frontale*)	CSC
Northern harrier (*Circus cyaneus*)	CSC
Cooper's hawk (*Accipiter gentilis*)	FSC, CSC
Swainson's hawk (*Buteo swainsoni*)	CT
Burrowing owl (*Athene cunicularia*)	FSC, CSC
California horned lark (*Eremophilia alpestris actia*)	CSC
Mountain plover (*Charadrius montanus*)	FSC, CSC
Fresno kangaroo rat (*Dipodomys nitratoides exilis*)	FE, CE
Giant kangaroo rat (*Dipodomys ingens*)	FE, CE
San Joaquin antelope squirrel (*Ammospermophilus nelsoni*)	CT
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT

***STATUS LEGEND:** FE = Federally listed Endangered; FT = Federally listed Threatened; FPT = Federal proposed Threatened; California Native Plant Society (CNPS 2001), CNPS 1B = Rare and endangered plants of California and elsewhere; CE = State listed Endangered; CT = State listed Threatened; and CSC = State Species of Special Concern; none = not listed as a federal nor state species, but identified in the Natural Diversity Database as sensitive species.

Due to the limited area affected by construction activities, and the existing degraded natural habitats, it is unlikely that special status plant species occur within most of the

project area. The special status plant species that potentially occur and/or have historically occurred in the vicinity of the project (Table 1, above) are known to inhabit native vegetation communities (i.e., valley grasslands and chenopod scrub habitats). These habitat types are extremely limited within the project area, and are only known to occur in areas that have not been converted to agriculture or other use (e.g., areas lining the California Aqueduct, Fresno Slough, and James Bypass).

Similarly, it is unlikely that most of the special status wildlife species listed in Table 1 above are present in the project area due to lack of suitable habitat. Special status wildlife species such as the giant garter snake, Swainson's hawk, burrowing owl, and kit fox, however, are highly mobile species that may occur in the vicinity of the identified transmission line reconductoring projects, and could potentially be adversely affected by project-related activities. In addition, migratory waterfowl are known to congregate within the vicinity of the project during winter migration periods, and may be attracted to the surrounding agricultural areas.

Swainson's hawks could nest in the riparian corridor near the Herndon and Gregg Substations, so work may need to be scheduled to avoid impacting active nests during spring and summer months. The valley elderberry longhorn beetle and host elderberry trees may also occur within the riparian habitat, so avoiding impacts to host plants may be necessary during reconductoring. The majority of the transmission line routes described above are located within agricultural and developed lands that may contain burrowing owls, so mitigation measures may be necessary to avoid impacts to nesting owls.

Mitigation

The Applicant has stated that general mitigation measures proposed in Section 8.2.5.1 of the AFC (e.g., Worker Environmental Awareness Training, preparation of a Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) and pre-construction surveys and monitoring) would apply to the reconductoring portion of the project and would effectively reduce potential impacts.

The Applicant has also proposed additional mitigation that includes conducting pre-construction surveys for special status species in locations where pole replacement activities are within 150 feet of areas that are considered potential habitat for special status species [e.g., the San Joaquin River, Cottonwood Creek, California Aqueduct, Fresno Slough or James Bypass (Calpine 2002)].

Staff agrees that the mitigation measures proposed in Section 8.2.5.1 of the AFC should apply to the Reconductoring Analysis Project, and that pre-construction surveys should be conducted near sensitive areas. In addition, Staff recommends implementation of all the applicable biological resources mitigation measures that are identified in the Energy Commission's Decision, and that the transmission line owner conduct pre-construction surveys at all construction-related locations (i.e., tower locations, pulling and tension locations, marshalling/staging areas, and access roads locations) that are within or near identified sensitive habitats [i.e., riparian and riparian scrub, the annual grassland area (James Bypass), emergent wetland areas (associated with irrigation ditches), and major

canals (irrigation ditch or open water features)] to determine if special status plant and/or wildlife species could be impacted by the proposed activities.

In addition to these measures, the CPUC may conduct its own environmental review of the reconductoring project, and would mandate implementation of mitigation measures for any identified potentially significant impacts. The CPUC routinely mandates standard construction mitigation measures, such as the use of Best Management Practices (BMPs), for all reconductoring projects it approves. With implementation of these standard measures, plus those that address potential impacts specific to this reconductoring project, such as the need to compensate for any habitat disturbance or take caused by transmission tower foundation work, it is likely that the reconductoring project could be accomplished without creating significant impacts to biological resources.

Conclusion

Since the reconductoring work would occur in or near sensitive species and/or habitats, staff concludes that reconductoring the transmission lines could adversely impact sensitive biological resources in and/or adjacent to the transmission line corridor. Potential impacts include direct take, and construction noise effects on nesting activities.

It is Staff's opinion that impact avoidance measures developed in the Staff Assessment for the SJVEC project (CEC, 2002) and herein (Mitigation) could help reduce potentially significant biological impacts to levels that are less than significant. The Applicant has not provided the specific type(s), acreage amount(s), and location(s) of habitat(s) that will be affected by the proposed reconductoring project. Therefore, it is not possible to provide a complete analysis of potential adverse impacts to biological resources. Staff recommends that after construction plans are finalized, the transmission owner should submit to the CPUC a complete project description (including specific construction locations), the habitat type(s) that will be affected, and the estimated acreage totals of each habitat impacted by the reconductoring projects.

Activities associated with reconductoring the transmission line would require compliance with applicable Federal, State and local laws, ordinances and regulations, including: Federal and State Endangered Species Acts, Federal Migratory Bird Treaty Act, and Federal and State Clean Water Acts. Specific agency permits might be required before any reconductoring work could commence. To determine which permits may be applicable to reconductoring the transmission lines, staff recommends that the CPUC consult the California Department of Fish and Game, U.S. Fish and Wildlife Service, and the U.S. Army Corp of Engineers.

If the reconductoring work complies with all applicable LORS, mitigation measures proposed by Staff and the Applicant, and standard Best Management Practices for construction activities are employed, Staff concludes that reconductoring of the eight lines described above would not likely result in significant impacts to biological resources.

3.2 CULTURAL RESOURCES

Introduction

The applicant assessed the potential environmental effects of reconductoring the Helm-Panoche, SJVEC-Panoche and SJVEC-Kearney 230kV transmission lines on a programmatic level in Data Response Set 3, submitted on August 23, 2002 (Calpine 2002). A more recent study by PG&E indicates that additional lines would need to be reconductored including 230 kV lines from SJVEC to Helm substation (1 mile), Kearney substation to Herndon substation (11 miles), Greg substation to Borden substation (8 miles), Greg substation to Storey substation (10 miles), and from SJVEC to McCall substation (32 miles). Potential impacts to cultural resources caused by the identified reconductoring projects could occur at or near the approximately 1-acre staging yards, additional staging areas or marshalling yards. Additional areas where ground disturbance might cause impacts are the access or maintenance roads associated with these areas, at the bases of transmission towers that require modification or replacement, and at additional tower foundations that may require excavation work. Modification or replacement of towers with higher towers may change the historical setting of the transmission lines. The transmission lines themselves may also qualify as historical resources.

The applicant contacted the California Historical Resources Information System (CHRIS) at the Southern San Joaquin Valley Archaeological Information Center in Bakersfield and the Native American Heritage Commission (NAHC) for records searches for information on known/recorded archaeological and historical sites, cultural resources surveys, and sacred lands within a one-half-mile radius of the existing electrical transmission lines. Fourteen archaeological sites are located within the one-half-mile radius, and two archaeological sites are recorded within the project area. Portions of the electrical transmission line, approximately 25 miles, from the Panoche to the Helm Substations were surveyed by the applicant's cultural resources staff in October 2001. The electrical transmission line from the Helm to the Kearney Substation, approximately 22 miles, has not been surveyed.

Staff also conducted a record search at the CHRIS at the Southern San Joaquin Valley Archaeological Information Center in Bakersfield of the additional reconductoring identified in the PG&E study, including an area ½ mile wide on each side of the transmission lines. The record search indicated that the majority of the areas of required reconductoring have not been surveyed, though several surveys have crossed the study area.

Depending upon the scope of work planned for the identified reconductoring projects, the unsurveyed portions of the line corridors described above may require a cultural resources survey. The potential for encountering Native American artifacts may make it necessary to contact the NAHC to obtain a list of concerned Native American's in the area. The identified Native American individuals or groups should then be contacted to assist in the identification of additional cultural resources or sacred sites.

The CHRIS search conducted by the applicant revealed that two important cultural sites are near one of the transmission line corridors described above.[3] Information from the archaeological site record for P-10-000559 along an existing electrical transmission line route indicates that it was probably a village site. The similar topography and setting that exists along the reconductoring route raises concerns regarding the existence of additional buried archaeological resources.

Cultural site P-10-0003081 along an existing transmission line route contains historic debris from the 1930s and 1940s. After additional surveys are complete, similar sites may be identified along the reconductoring routes.

Impacts of Reconductoring

Ground disturbance, the presence of vehicles driving over the top of sites and the installation of new poles, the modification or repair of existing poles and their foundations could all damage archaeological resources. After the archaeological and historic surveys are complete and after the work area is defined, additional archaeological sites or historic resources within the built environment may be identified. If the one or more of the transmission lines described above are determined to meet the criteria for eligibility to the NRHP or CRHR, the reconductoring effort may create an impact to these resources.

Mitigation

The applicant recommends that the two archaeological sites recorded along one of the routes be revisited to determine any possible effects the project may have on these locations. Moreover, the applicant recommends that the 22 miles of transmission line from Helm to Kearney Substations be surveyed prior to the startup of field operations for the reconductoring project.

Staff recommends that a cultural resources survey be conducted along all the transmission lines that would be reconductored. Any areas that have not been surveyed within the last five years should be surveyed. In addition, staff recommends monitoring during ground disturbance at pull site locations or other areas where key project activities are occurring.

Particular caution should be taken in the vicinity of previously identified archaeological sites. If cultural material is identified, ground disturbance should halt until the find can be evaluated. Additional mitigation measures should include formal site recordation, evaluation and if appropriate data recovery and curation. Previously identified archaeological sites should be evaluated and if they meet the criteria for eligibility to either register and they can not be avoided, data recovery should be conducted as a mitigation measure.

An impact to a historical resource is significant if the impact results in the significance of an historical resource being materially impaired. Whether actions of a project constitute a significant impact depends upon which criteria are applicable to the cultural resource

[3] The exact location of these two sites are confidential due to the potential for illegal disturbance of the sites.

in meeting eligibility to the NRHP or CRHR and whether the aspects of the cultural resource that make it significant will be impacted by the project. To ensure that there will not be a significant impact to a cultural resource it is necessary to evaluate the potential resource according to criteria for eligibility to either the NRHP or the CRHR. It is appropriate to consider potential cultural resources that may be older than 45 years or exceptional for eligibility to the NRHP or the CRHR. After it is determined whether potential cultural resources meet the criteria for eligibility to the NRHP or the CRHR, then it is necessary to consider whether physical alterations may be an impact. Whether the resource has unique features may or may not play a role in whether it meets the criteria for eligibility to either register and are not valid criteria for deciding whether or not to evaluate the resource.

Staff also recommends evaluation of any transmission lines that would be reconductored that are 45 years old or may be considered exceptional. Recordation may serve as mitigation for impacts if a line is recommended as meeting criteria for eligibility to the NRHP or CRHR.

Conclusion

It appears that one or more of the proposed reconductoring routes are sensitive for archaeological resources. Depending on the scope of work associated with the reconductoring project, such as whether it would include new foundations or raising the height of some towers, some of the resources may be adversely affected as a result of the reconductoring effort. In general, after all cultural resources are identified and a determination is made regarding whether they meet the criteria for eligibility to either the NRHP or the CRHR, except in cases where a cultural resource is demolished, mitigation is usually possible through recordation or data recovery.

3.3 LAND USE

Introduction

The Land Use analysis focuses on the project's compatibility with the existing and planned land uses, and the project's consistency with local land use plans, ordinances, and policies. The reconductoring anticipated to occur as a result of construction and operation of the SJVEC involves replacing eight existing transmission lines in six corridors with newer lines of similar weight and greater capacity. Therefore, existing transmission towers in established utility corridors that conform to all applicable LORS, including general plan goals of Fresno and Madera Counties, can be utilized.

Reconductoring the lines described above would each require a temporary staging yard of about one acre at each of their terminal ends, and an additional staging area near the Helm substation. Marshalling yards would likely be located on agricultural land next to the end-point substations, and would be rented or leased for the four- to five-month construction period. Landowners would be compensated for crop disturbance and loss.

Concentrated work will most likely occur at some of the transmission tower deadend locations, many of these at angled towers. Conductor pulling, payout, and sagging/tensioning equipment will be stationed at some these locations. Each work area will be approximately 100 by 200 feet in size (0.46 acre). Work areas will be delineated so as to avoid sensitive biological and cultural resources.

The applicant proposed that the right-of-way for each transmission corridor would be cleaned up when its reconductoring activities are complete. Project-related debris would be removed from the right-of-way and disposed of at an appropriately licensed facility. The appropriate land management agency and landowner(s) would approve these locations. Ruts and other similar disturbances would be smoothed. Any areas requiring revegetation would be seeded with a weed-free seed mix approved by the appropriate land management agency and landowner(s). Reconductoring would require access to the existing transmission line right-of- way by construction vehicles and equipment. The transmission line routes are easily accessible via agricultural roads that are generally perpendicular to main paved roads, such as Manning Avenue.

Conclusion

Potential impacts to land use would be short-term and confined to the work areas. They would not displace any existing use. There would be no significant land use impacts along the electrical transmission line route related to the reconductoring projects. Therefore, no mitigation measures are warranted.

3.4 NOISE

Introduction

Reconductoring the eight transmission lines described above would require operation of heavy equipment at pull and tensioning sites, and at several transmission towers that may require modification. Potential sites for pulling and tensioning sites would be required. The potential for heavy equipment operation to disturb adjacent noise-sensitive land uses during the temporary period of line work was reviewed by the Applicant. After the reconductoring work is complete and the lines are operational, the Applicant expects no change in corona noise levels.

Impacts of Reconductoring

Reconductoring work would require operation of construction-type equipment at the pull and tensioning sites. In some cases, a helicopter may be used to string line. A period of 4 to 5 months is estimated to complete the reconductoring. At a distance of 300 feet, most construction equipment would not be louder than approximately 70 decibels, which would not be likely to disturb surrounding agricultural or undeveloped land uses. To manage noise from the work sites, the applicant proposes that work would only occur during daylight hours.

After reconductoring the lines, CEC staff would not expect any substantial increase in corona noise levels. Corona noise is a function of the line voltage and the condition of the line. Because voltage would remain the same after reconductoring and the condition of the line would be upgraded, corona noise may actually be reduced.

Mitigation

Energy Commission staff recommends implementation of mitigation measures similar to the proposed Conditions of Certification from the Staff Assessment NOISE-1, NOISE-2, and NOISE-7 to minimize potential impacts by implementing the complaint resolution process and specifying construction hours. For convenience, those Conditions of Certification are listed below:

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within one-half mile of the site and the linear facilities, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement, signed by the project manager, stating that the above notification has been performed, and describing the method of that notification,

verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- If the noise is project related, take all feasible measures to reduce the noise at its source; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts; and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within 5 days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the local jurisdiction and the CPM documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a 3-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

CONSTRUCTION TIME RESTRICTIONS

NOISE-8 Heavy equipment operation and noisy construction work shall be restricted to the times of day delineated below:

Monday-Saturday	6 a.m. to 6 p.m.

Noise due to start-up steam blows shall be restricted to the times of day delineated below:

Monday-Saturday	6 a.m. to 6 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

Conclusion

By implementing mitigation measures similar to the Conditions of Certification that were proposed in the Staff Assessment for construction of the SJVEC plant, potential noise impacts from reconductoring work would be avoided.

3.5 TRAFFIC AND TRANSPORTATION

Introduction

The majority of reconductoring activities would take place over intensively cultivated agricultural fields and orchard lands. The existing transportation network that would be affected by the anticipated reconductoring projects is comprised of local roadways in Fresno and Madera counties. The area's roadways (e.g., Manning Avenue) would be used for transportation of equipment and access to the temporary staging areas. Local rail lines (e.g., Union Pacific Railroad) may also be used for delivery of equipment and materials. As indicated in the AFC, all the roadways potentially affected by the SJVEC project, including those proposed for use in reconductoring activities, are operating at or above an acceptable LOS. All reconductoring activities will comply with traffic and transportation LORS administered by Caltrans, the County of Fresno, the County of Madera, and the City of San Joaquin.

The reconductoring workforce will consist of 15 to 20 workers, including a foreman, equipment operators, general laborers and environmental monitors and inspectors. The applicant estimates that the reconductoring will take between 4 to 5 months to complete. The applicant has also indicated that typical equipment (i.e., a tensioner and cable puller) would be used for the purposes of reconductoring. These are generally large, 10-wheel trucks that are designed for heavy loads. Additionally, a conductor-cable reel trailer, boom truck, aerial bucket truck or helicopter may be used during reconductoring activities. Each cable stringing operation requires three to five pieces of equipment and related support vehicles. The choice of equipment to be used is affected by the ease of access, and the presence of potentially significant environmental impacts such as disturbance of natural habitats that support a variety of plant and animal species. Temporary staging areas will be used for equipment and material storage.

Impacts of Reconductoring

Because the majority of reconductoring activities would take place over agricultural lands, they would have minimal impact, if any, on the traffic level of service for the highways and roads in the vicinity. Any activity that needs to occur outside of the transmission line right-of-way will require landowner notification and permission for access. Movement of heavy machinery on local roads would occur intermittently, but infrequently over the four to five month reconductoring project schedule.

The minimal reconductoring activity that would occur on highways and roads could have the following potential impacts:

- Use of undesignated access roads or public roads could affect local traffic and create safety hazards;
- Use of public roads for parking reconductoring vehicles and workers' personal vehicles could affect local traffic; and
- Occasionally during overhead construction projects, materials fall into the roadway, which would create a safety hazard.

These potential impacts can be avoided through the mitigation measures proposed below.

Mitigation

Staff recommends that all reconductoring related vehicle movements outside the transmission right-of-way be restricted to pre-designated access or specified public roads. Should unforeseeable circumstances occur during reconductoring activities, resulting in the disturbance of more areas than initially requested, the project owner should obtain permission from the landowner.

All reconductoring related parking should take place on pre-designated and contractor-acquired staging areas. Condition of Certification TRANS-4 in the July 17, 2002 Staff Assessment for the SJVEC directs the project owner to develop a parking and staging plan for all phases of project construction. Staff recommends that a similar condition apply to any reconductoring project associated with construction and operation of the SJVEC.

Finally, staff recommends that the entity that carries out any needed reconductoring work consider the need for installation of netting as a safety precaution to reduce the potential for construction materials falling on motorists, bicyclists, or pedestrians during the tensioning/cable pulling process where reconductoring activities require the crossing of roadways.

Conclusion

The reconductoring activities proposed for the SJVEC would not result in any substantial traffic and transportation impacts. Even with the required reconductoring, the SJVEC project would still be in compliance with all applicable LORS. The small amount of traffic trips generated from the reconductoring activities would not result in any impacts beyond those evaluated in the AFC and the Staff Assessment. Additionally, implementation of the above mitigation measures would reduce any potential traffic and transportation impacts resulting from reconductoring to insignificant levels.

3.6 TRANSMISSION LINE SAFETY AND NUISANCE

Introduction

The identified reconductoring would involve only the substitution of new conductors for existing ones as necessary for effective and safe transmission of the additional energy from SJVEC. If the identified lines are reconductored, the electric and magnetic field impacts that were addressed in the Staff Assessment (SA) for the San Joaquin Valley Energy Center (SJVEC) would also be of potential concern for the area along the respective routes. As noted in the SJVEC SA, the magnitude of such fields depends on line voltage and current levels. The potential for perceivable field impacts and significant field exposures would depend on the chosen design, the current levels, and distance from the line.

Impacts of Reconductoring

Since the retrofitted lines would be operated at the same voltage (230 kV) as the existing lines, the magnitude of the electric field along each route would not change from current levels, meaning that the types of electric field impacts that were addressed with respect to the SJVEC-related transmission lines would not change from existing levels. The only field-related change from the retrofit (and its related increases in current flow) would be with respect to the magnetic field, whose intensity depends directly on current levels, as noted in the SJVEC FSA.

Since the retrofitted lines would remain within their existing routes, the retrofit-related increases in magnetic field intensity would lead to corresponding increases in human exposure to line magnetic fields. As noted in the submittal from the applicant, (Calpine 2002, page 15), any reconductoring of the identified lines would not change the land use along the respective routes. Given the general absence of residences in the immediate vicinity of the lines at issue, the residential magnetic field exposures at the root of the present health concern would be insignificant after reconductoring. The only field exposures of potential significance are to line workers and individuals in transit under the line. These types of exposures are well understood as not significantly related to the present health concern.

Mitigation

The California Public Utilities Commission's (CPUC's) way of ensuring the appropriate management of fields from high-voltage power lines (in light of the current health concern) is to require incorporation of specific field-reducing measures in the design for new or retrofitted lines. The applicable measures for the proposed SJVEC lines and the lines that might be retrofitted are those specified in PG&E's guidelines prepared in compliance with current CPUC's requirements. Staff's recommended conditions of certification in the SJVEC SA are intended to ensure compliance with this CPUC policy as related to field strengths, perceivable field effects, electric shocks, and human exposure. Since the reconductored lines would be designed and operated according to standard PG&E practices (Calpine 2002, pages 8 and 9), staff would expect these lines to be operated in accordance with the applicable health and safety laws, ordinances, regulations and standards (LORS).

Conclusion

If the identified 230 kV lines are reconductored, they would be designed, built and operated (within their existing routes) according to CPUC's requirements, reflecting compliance with the health and safety LORS of concern to staff. Therefore, staff would not expect their operation to pose a significant health and safety hazard to individuals in the area.

3.7 VISUAL RESOURCES

Introduction

This analysis examines the potential visual resource impacts associated with the anticipated reconductoring of the eight transmission lines described above.

Impacts of Reconductoring

Reconductoring of the eight transmission lines described above would each require a one-acre staging yard at each of their terminal ends, plus an additional staging area located at the SJVEC site near the Helm substation. Marshalling yards would likely be located on agricultural fields next to the endpoint substations, and would be rented or leased for the construction period. Each reconductoring project would take approximately four-to-five months, overall.

The project area consists of primarily agricultural land uses. There are no cities along the identified transmission lines, but the number of proximate farm houses, residences and landscape habitat types increases east of McMullin substation, where most of the identified line segments are located. The transmission line routes are accessible via agricultural roads that are generally perpendicular to main paved roads, such as Manning Avenue. The Herndon-Kearney line and the SJVEC-McCall line cross heavily-traveled Highway 99.

Conductor pulling and tensioning equipment would be located at various locations along the transmission lines. Construction equipment and activities would likely be visible to motorists and the few rural residents living near the lines. Due to the relatively temporary nature of project construction, the adverse visual impacts that would occur during construction would not be significant. However, this conclusion assumes that construction areas and rights-of-way are restored to their pre-project conditions.

Reconductoring involves the replacement of existing electrical transmission wires (conductors) with new wires. This change to the transmission lines would be undetectable to viewers of the lines. Until the project is in the final design stages, it is not known whether it would be necessary to raise the height of existing towers or replace towers with stronger towers in order to accommodate the sag requirements and heavier weight of the new wires. Because the existing transmission line and towers are an established part of the setting, the adverse visual impacts that would occur due to the new wires and any changes in tower height or design would likely not be significant. However, this conclusion assumes that the new wires and towers would incorporate typical measures to mitigate potentially significant adverse visual impacts.

Mitigation

With the inclusion of the following typical mitigation measure, impacts associated with reconductoring activities would likely not be significant:

- All evidence of construction activities, including ground disturbance due to staging and storage areas, should be removed and remediated upon completion of construction. Construction areas and rights-of-way should be restored to their

original grade and contouring. Any vegetation removed in the course of construction should be replaced on a one-to-one in-kind basis.

With the inclusion of the following typical mitigation measures, operation of the reconductored lines would likely not cause significant adverse visual impacts:

- Transmission towers should be treated with non-glare finishes and painted in colors that would blend with the surrounding environment;
- Non-specular conductors should be used; and
- Insulators should be non-reflective and non-refractive.

Conclusion

The reconductoring project has the potential to cause adverse visual impacts. Feasible mitigation measures are available that would likely keep the visual impacts of the reconductoring project to levels that would not be significant. Other mitigation measures to reduce the visual impacts of the project may be identified as more detailed and specific environmental information is developed and analyzed.

3.8 SOIL & WATER RESOURCES

Introduction

In association with the proposed SJVEC, it may be necessary for PG&E to reconductor eight 230 kV transmission lines, as described above. The lines run primarily across lands used for agriculture including orchards and row crops. Land in the vicinity of the transmission line corridors is gently sloped or flat in topography. Soil types for the transmission line routes would consist of the Merced Clay/Clay Loam, or soils similar in properties to the Merced Clay/Clay Loam. Merced soils developed on mixed igneous and sedimentary alluvium deposited in the lowest portions of the valley basin. These soils formed in floodplains primarily as overbank flood deposits and were derived chiefly from granitic rocks in the Sierra Nevada. In particular, the fine-grained alluvial sediments upon which Merced-series soils formed were deposited by the Kings River via the Fresno Slough during flood stage. Merced soils tend to drain moderately well, have very low erosion potential, and have a fair to excellent revegetation potential. Although some of the affected soils are considered to be saline and saline-alkali soils, revegetation should be successful provided adequate irrigation is provided while plants are established. (SJVEC 2001a, AFC Sections 8.4, 8.9 and 8.16.3.5.2) (SJVEC 2002d, Data Request #82).

Impacts of Reconductoring

Towers and Footings

PG&E has indicated that in general during reconductoring projects, it may be necessary to raise the height of several towers to allow for greater conductor sag. Similarly, inspections prior to starting the reconductoring work may reveal that some towers require new foundations, which may increase the potential for earth disturbance and erosion. The transmission lines cross several water conveyance features that include the San Luis Canal of the California Aqueduct, the James Bypass and Cottonwood Creek. Construction activities for new towers and footings would not occur within any watercourses; therefore, impacts to water quality for construction and operation of the transmission lines would be less than significant. By implementing Best Management Practices (BMPs), such as sediment trapping devices, limiting the amount of exposed areas at a given time, restabilizing disturbed areas, and avoiding earth disturbance activities within watercourse, the overall impacts related to erosion and sediment control would be less than significant.

Reconductoring without New Towers and Footings

If existing towers can be used or reinforced without construction of new towers and footings, the potential for impacts to soils and water resources is significantly reduced. Work sites using larger truck-mounted equipment would likely be limited to areas near angle towers (greater than 20 degrees). Temporary pull and tensioning sites would require an area of about 100 by 200 feet (0.5 acre) for equipment setup. These temporary sites would be susceptible to erosion from soil disturbance and compaction as a result of the vehicular traffic; however, the soil types in the potentially affected areas are clays, which generally have a low erosion hazard potential.

Mitigation

Towers and Footings

The following mitigation measures should be implemented for earth disturbance activities associated with any needed work on tower footings:

- Construction should be performed in accordance with an Erosion and Sediment Control Plan (ESCP). The ESCP should address erosion and sediment control BMPs during construction and revegetation measures following construction.

- If construction could affect land in aggregate of 1 acre, then a Storm Water Pollution Prevention Plan (SWPPP) would be required. The Central Valley Regional Water Quality Control Board (RWQCB) would likely serve as the reviewing authority of the SWPPP, and may require a General NPDES Permit for Storm Water Discharge Associated with Construction Activity.

- Existing roads and rights of way should be used to the greatest extent possible.

Reconductoring

For temporary disturbance areas established on soil for pull and tensioning sites, and for work sites set up to modify existing towers, the following mitigation should be implemented:

- Construction should be performed in accordance with an Erosion and Sediment Control Plan (ESCP). The ESCP should address erosion and sediment control BMPs during construction and revegetation measures following construction.

- If construction could affect land in aggregate greater than 1 acre, a Storm Water Pollution Prevention Plan (SWPPP) would be required by the Central Valley Regional Water Quality Control Board (RWQCB) as required in a General NPDES Permit for Storm Water Discharge Associated with Construction Activity.

- Existing roads and rights of way should be used to the extent possible.

Conclusion

Significant environmental impacts to soil and water resources related to construction and operation of the Reconductoring project would be avoided by implementing the aforementioned mitigation measures.

3.9 TRANSMISSION SYSTEM ENGINEERING

Introduction

Reconductoring of the eight transmission lines described above, should they occur, would involve removing the existing conductors and replacing them with higher rated conductors, in a manner that complies with applicable safety and reliability standards. The System Impact Study for the project recommends replacing the existing conductors (either 795 ACSR or 1113 Aluminum) with 1113 AL or ACSS conductors, or 954 ACSS conductors. Each of these new conductors will significantly increase the ratings of the transmission lines. Insulators would also be removed and replaced with new strings, which would increase the line's capability to withstand voltage surges. Please see Chapters 1 and 2 of this Appendix for additional description of the likely construction areas and methods.

Impacts of Reconductoring

During construction, applicable safety and reliability Laws, Ordinances, Regulations and Standards (LORS) must be met. These include CPUC General Order 95, Title 8 CCR Construction Safety Orders, and PG&E Construction Standards. Additionally, to maintain system reliability the Cal-ISO must be advised per the Cal-ISO scheduling protocol of scheduled circuit outages prior to occurrence. Such outages are scheduled about 30 days prior to occurrence and are verified just prior to actual outage. In the event that system reliability requires restoring such circuits, a "no work" order is given and where practicable, circuits are restored.

Reconductoring of the eight transmission circuits described above would result in local system benefits, in that it would provide considerably greater flexibility in routing power in the Greater Fresno Area transmission network, even if the SJVEC is not built. The reconductoring project would not only ensure that the SJVEC project could generate at its rated capacity, but would increase the capacity and reliability of power deliveries to and from the Greater Fresno Area. Parts of the transmission and distribution system in the Greater Fresno Area may also have to be upgraded in order to take full advantage of the increased capacity of the eight lines.

Mitigation

To mitigate potential safety and reliability impacts the above stated LORS and Cal-ISO scheduling protocols would be used. The CPUC assures conformance with the above safety requirements; the Cal-ISO would assure conformance with its reliability requirements.

Conclusion

Conformance with applicable safety and reliability is likely to occur and would be successful in mitigating any safety or reliability implications of reconductoring.

3.10 GEOLOGY AND PALEONTOLOGY

Introduction

The eight transmission lines anticipated for reconductoring are all located in the California Great Valley geomorphic province. This area within the Great Valley is characterized by relatively flat ground cut by several small drainages, including the Fresno Slough. These transmission lines traverse Great Valley Sequence deposits. The SJVEC to Panoche and Helm to Panoche lines traverse Holocene flood basin deposits of clay, silt, and sand and Miocene to Holocene sedimentary deposits of clay, silt, sand, and gravel that are derived from continental rocks (Page, 1986). The SJVEC to Kearney line traverses Holocene flood basin deposits of clay, silt, and sand, Holocene windblown sand and dune sand, and Miocene to Holocene sedimentary deposits of clay, silt, sand, and gravel that are derived from continental rocks (Page, 1986). The McMullin to Kearney line traverses Holocene flood basin deposits and sand dune deposits and Miocene to Holocene continental rocks and deposits. The SJVEC to McCall line traverses Holocene flood basin deposits and sand dune deposits. The Herndon to Kearney, Borden to Gregg and Gregg to Storey lines traverses Miocene to Holocene continental deposits.

The Holocene flood basin deposits are described by Page (1986) as clay, silt, and some sand that in places may include part of the Modesto Formation (Pleistocene). The Holocene sand dunes are described as windblown sand and dune sand. The Holocene river deposits are described as gravel, sand, silt, and minor amounts of clay that in some places may include part of the Modesto Formation (Pleistocene). The Miocene to Holocene continental rocks and deposits are described as a heterogeneous mix of generally poorly sorted clay, silt, sand, and gravel and includes the Modesto and Riverbank Formations.

The closest known active fault is the Coast Ranges – Sierran Block Boundary Zone (CRSBBZ), located approximately 3 miles west of the Panoche Substation. Energy Commission staff have calculated an estimated deterministic peak ground acceleration to be on the order of 0.4g. Energy Commission staff have calculated an estimated peak ground acceleration to be on the order of 0.2g for the Helm Substation and 0.1g for the Kearney Substation. These estimates are based upon a moment magnitude 6.4 earthquake in the Coast Ranges – Sierran Block Boundary Zone (CRSBBZ). The closest known active fault to the eastern lines is the Foothills Fault System, located approximately 21.5 miles north of the Storey Substation. Staff has calculated an estimated deterministic peak ground acceleration to be on the order of 0.1g. This estimate is based upon a moment magnitude 6.5 earthquake on the Foothills Fault System.

Impacts of Reconductoring

Since no new facilities, including electrical transmission towers, are anticipated to be constructed as part of reconductoring related to the SJVEC, the impacts to geologic and paleontologic resources would be limited to temporary staging areas and marshalling yards. These sites would not require significant grading or other disturbance of soils at depth. As a result, geologic hazards should have minimal impact on the reconductoring

projects as long as no new towers are constructed. Since minimal ground disturbance and excavation of site soils is anticipated, it is Staff's opinion that the potential for impacts to geologic and mineralogic resources is low.

No significant fossil fragments were identified in the AFC at the SJVEC or associated water and gas linears; however, significant fossils were present within ½-mile of the SJVEC and along the proposed water line linear. In addition, the geologic units mapped as being present along the electrical line linears have been assigned a high sensitivity (Calpine, 2001a) with respect to potential paleontologic resources during a previous paleontologic survey. As a result, the geologic units present along electrical line linear routes may contain significant paleontologic resources such that mitigation measures will be necessary.

Mitigation

Though not anticipated for the reconductoring work identified above, there is a potential to uncover significant paleontological resources during any ground disturbing activities that may be associated with the reconductoring of the electrical lines, such as during any needed excavation required to upgrade tower foundations, etc. Therefore, if the reconductoring work includes excavation or other significant ground-disturbance activities, Staff recommends that measures to mitigate the impact to paleontological resources be implemented. Suggested measures are included in the Staff Assessment as PAL-1 through PAL-7.

Conclusion

The project will result in no significant impacts to the public or the environment with respect to geologic hazards or geologic, mineralogic, or paleontologic resources, provided that the proposed mitigation measures are implemented and the project complies with applicable LORS.

4 CONCLUSION

Chapters 2 and 3 of this Appendix describe the process and the potential impacts of reconductoring the Panoche-Helm, Panoche-SJVEC, SJVEC-Helm, Helm-Kearney, Herndon-Kearney, Borden-Gregg, Gregg-Storey and SJVEC-McCall Transmission Lines. This study was undertaken to inform the Energy Commission and the general public of the potential indirect environmental and public health effects caused by the approval of the SJVEC project.

The environmental and engineering disciplines can be divided into two groups: those with the potential for significant impacts, and those in which impacts are easily mitigable or less than significant. This analysis determined that impacts in the following discipline areas would likely be less than significant for reconductoring projects (some with implementation of standard mitigation measures, such as fugitive dust control to control emissions of particulate matter during construction, for example):

- Air Quality
- Facility Design
- Hazardous Materials Management
- Land Use
- Noise
- Power Plant Efficiency
- Power Plant Reliability
- Public Health
- Socioeconomic Resources
- Soil and Water Resources
- Traffic and Transportation
- Transmission Line Safety and Nuisance
- Transmission System Engineering
- Visual Resources
- Worker Safety
- Waste Management
- Worker Safety

The disciplines where potential impacts reconductoring are of most concern are biological resources, and cultural resources. The conclusions of these analyses are described below.

Biological Resources: Since the reconductoring work would occur in or near sensitive species and/or habitats, staff concludes that reconductoring the transmission lines could adversely impact sensitive biological resources in and/or adjacent to the transmission line corridor. Potential impacts include direct take, and construction noise effects on nesting activities. Impact avoidance measures developed in the Staff Assessment for the SJVEC project and herein could help reduce potentially significant biological impacts to levels that are less than

significant. Staff recommends that after construction plans are finalized, the transmission system owner should submit to the CPUC a complete project description (including specific construction locations), the habitat type(s) that will be affected, and the estimated acreage totals of each habitat impacted by the reconductoring projects. Specific agency permits might be required before any reconductoring work could commence. Staff recommends that the CPUC consult the California Department of Fish and Game, U.S. Fish and Wildlife Service, and the U.S. Army Corp of Engineers.

If the reconductoring work complies with all applicable LORS, mitigation measures proposed by Staff and the Applicant, and standard Best Management Practices for construction activities are employed, Staff concludes that reconductoring of the Helm-Panoche and Helm-Kearny sevel lines described above would not likely result in significant impacts to biological resources.

Cultural Resources: It appears that one or more of the proposed reconductoring routes are sensitive for archaeological resources. Depending on the scope of work associated with the reconductoring project, such as whether it would include new foundations or raising the height of some towers, some of the resources may be adversely affected as a result of the reconductoring effort. In general, after all cultural resources are identified and a determination is made regarding whether they meet the criteria for eligibility to either the NRHP or the CRHR, except in cases where a cultural resource is demolished, mitigation is usually possible through recordation or data recovery.

Staff has concluded that, with the implementation of appropriate mitigation measures, reconductoring of the eight transmission lines described above has very little potential for creating significant, unmitigated impacts to public safety or the environment.

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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION
OF THE STATE OF CALIFORNIA

Application for Certification of the SAN JOAQUIN VALLEY ENERGY CENTER POWER PLANT PROJECT IN FRESNO COUNTY (CALPINE CORPORATION)	**Docket No. 01-AFC-22** **PROOF OF SERVICE** ***(*REVISED 10/21/03)***

I, Pat Owen, declare that on November 19, 2003, I deposited copies of the attached **STAFF'S ANALYSIS OF RECONDUCTORING PROJECTS RELATED TO THE SAN JOAQUIN VALLEY ENERGY CENTER REVIEW PROCESS (01-AFC-22)** in the United States mail at Sacramento, CA with first class postage thereon fully prepaid and addressed to the following:

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